these closely allied species to have been originally of one parentage, how did the power in one case to change to bright color, or in the other to resist the tendency to color, originate? If by chemical power alone, it would occur at once, as a piece of white wood is at once browned by fire, but with the vital principle opposed to this chemically destructive principle, it would take more time to accomplish this change; and the change, once made, would again require more time to again alter the fixed condition. This is essentially the foundation of the law of heredity, and under its operation we could not reasonably look for a change in the coloring power of these European trees although light were an active agent, under even more than five or ten inherited generations.

At any rate we have in these salt-marsh plants the evidence that the plants of one country, in that country colorless, can be made to take the most brilliant colors when growing in ours. That these plants had one primary origin is certain, though the ancestry may have been separated by thousands of years. We know that plants introduced at once do not change at once—heredity forbids it. We may assume therefore that it was only after some generations on the American coast, under the influence perhaps of American light, that these European plants showed their American colors. We can see in these annual plants, with a new generation every year, the results in numerous generations, as we cannot see in the slower reproducing tree.

Mr. Meehan thought that though we could not say we had vet reached an unchallengeable solution of the cause of autumn color in American foliage, considerations like these brought us nearer to the end.

NOVEMBER 8.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-six persons present.

On Movements and Paralysis in the Leaves of Robinia.—Mr. THOMAS MEEHAN said that an inquiry of Prof. Sargent for a trunk of *Robinia viscosa* for the National Forestry Census, had led him to look closely into the history of *Robinia* in general, with some interesting results.

Though our text-books gave "Virginia and Southwards" as the native location of the tree, no one seems to have collected it of late years. Indeed herbarium specimens generally seemed to be from cultivated plants, and he could find nowhere direct evidence that it had ever been found wild by any botanist since its original discovery by Wm. Bartram, as we learn from his "Travels," and Michaux, as recorded by Ventenat in his "Plants of the Garden of Cels," towards the end of the last century. In

northeastern Pennsylvania and contiguous parts of New Jersey he had seen it the past season, in a number of places in gardens, and in most cases it was stated that the plants had originally been obtained from almost inaccessible places on the high hills of that part of the country. The fact that in these remote places trees from the distant nurseries are seldom obtained, together with the fact that the plant is not now nor probably has been for many years cultivated in American nurseries, makes it possible that the reports are true, and the plant may be found in the spurs of the higher Allegheny range. The highly viscose character of this species is interesting. The excretory glands are low and broad, with a crater-like mouth, from which the sticky matter flows, and soon covers the stem as with a thick coat of varnish. The viscid strength was such that in some instances the mere contact with a lead-pencil was sufficient to draw a branch towards the person pulling it. So many plants with viscid secretions have insects found adhering to the sticky matter, that it has been shrewdly suspected the secretion in such cases is a design for entrapping insects, from which the plant perhaps obtains a better supply of nitrogen than in the ordinary manner through the atmosphere. In the case of this clammy locust no insect was found adhering, though it would seem probable that some few, by blind accident, at least, ought to have been found there. For what purpose in the economy of the plant this secretion is formed, cannot be conjectured. From this view of individual benefit alone to the plant, or to the race, the secretion seemed an enormous waste of nutritive power. This waste seemed even more conspicuous in the inflorescence. It was too early to judge of the amount of seed the plants would produce; but many flowers had fallen, leaving no ovarium behind in a single instance. There were no indications that a solitary seed-vessel would result from all the flowers which had expanded up to that time; and if any seed perfected, they would have to be from a few of the later flowers. In any event, the amount of waste material in the barren flowers was enormous.

Here it was remembered that a belief widely prevails which regards flowers and insects as having been interadapted to each other. It is believed not only that flowers are often to be cross-fertilized by insects before they can perfect seed, but that special insects are adapted to certain plants, which in the absence of these special insects remained barren. An ally of this clammy Robinia, *Robinia hispida*, has been under culture in America and Europe for a great many years; but the speaker said he had never seen nor knew of any one who had seen a single seed-vessel from any garden plant. He had come to believe it probable that some special insect, adapted to the pollinization of this plant, existed in the native place of growth of this species, but which insect had not followed the plant in its artificial distribution over the earth. This season he had found the plant, for the first time

in his botanical explorations, on the top of Lookout Mountain in Tennessee; but there, as under cultivation, he failed to see a single seed-vessel. He had been asked since, by a distinguished Belgian scientific gentleman, whether he noted any plants among the others which indicated a possibility of being recent seedlings. It had not occurred to him to look especially for these; but they would in all probability have been noticed if they had been present. He said it was not to be inferred that because neither he nor others had found seed, the plant never produced them. Experience with many other plants showed that they might be barren for years, and then become suddenly fertile. It was more than probable that long in the past these species were seminally fertile, perhaps capable of self-fertilization, and that the infertility of the flowers is a modern imbecility, which, as indicated in his Detroit paper before the American Association for the Advancement of Science, is the general concomitant of a species which has almost run its race. That these two species rarely produced seeds in modern times might be inferred from the fact, that though both were very fertile in suckers, they were certainly limited to very few locations. If with the power of producing seed to any considerable extent, they would soon spread over wide areas. If they had been deprived of the power of producing seed in very far away ages, by the power of suckering alone they would have been more widespread than they are. There seems to be no other logical conclusion than that the plants once seeded freely; but that this power must have been long lost, to account for the comparative limited areas to which the species are now confined.

Perhaps the most interesting new facts noted are those connected with the motion of the leaves in the two species named, as well as in *Robinia pseudacacia*, though the most strongly marked in *Robinia hispida*. There is a diurnal as well as a nocturnal motion, each in a separate direction. At a few hours before sundown, each pair of pinnæ are perfectly horizontal. The entire leaf is perfectly flat. With sundown the leaflets begin to droop, till, by dark, they are perfectly pendent, the under surface of each leaflet almost touching the under surface of the leaflet opposite to it. With the advent of morning, the leaflets arise; and soon after sunrise, the whole leaf is flat, as just before sundown, but they continue to rise, till, by noon, the opposite leaflets have met above the common petiole, almost touching each other by their upper surfaces at midday, as they nearly touch by their lower surfaces by night. In other words, instead of traveling ninety degrees, as do other plants the leaves of which "sleep" at night, these leaflets make a daily circuit of one hundred and eighty degrees.

Besides these novel facts, Mr. Meehan noticed what he could not but regard as a case of paralysis. About the middle of September, he noticed a sucker from one of his plants, which had finished its growth for the season after having made about a dozen nodes. While at midday the leaflets were erect, three leaves had

all their leaflets drooping as at night. How long they may have been in this condition before being noticed is not known, but they continued in that "sleeping" condition till this date (November 7), the others having gone through their motions daily till now. During the last few days, however, the thermometer having once been nearly down to freezing point, only the two or three upper pinnules on the leaves have retained the power to move. The paralyzed leaves were in every respect as healthy looking as the others, but they were, all three, somewhat smaller. If these had been all together at the lower or upper end of the branch, the peculiarity might have been referred to some cause connected with maturity; but the first paralyzed leaf was the third from the top, the next the fifth, and the other the sixth; that is to say, there were leaves with perfect motile functions above and below these, as well as one among the three. Though for the six weeks, at least, they had lost the power of motion, the color and general healthy appearance of the leaves were precisely the same as the others. There was no difference whatever except in the length of the common petiole and size of the leaves. They were about three-fourths the ordinary size. The upward movement of the pinnules in this species is confined to those exposed to the sunlight; those shaded by even their own foliage have not the power.

Mr. Meehan had previously called the attention of the Academy to the fact that a large number of plants draw the upper surface of the leaf together in bright light, as illustrations of which he mentioned now: *Halesia tetraptera*, *Cornus florida*, *Cornus mas* and *Magnolia acuminata.*

NOVEMBER 15.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-one persons present.

NOVEMBER 22.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-nine persons present.

A paper entitled "On a fœtal Kangaroo and its Membranes," by Henry C. Chapman, M. D., was presented for publication.

The death of the Rev. Z. M. Humphrey, a correspondent, was announced.